

Date: 6/29/2009

California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California

Project ID	Project Type	Status	In progress	Estimated Completion Date	June 2009
1	Dairy Emissions				

Project Name
National Air Emissions Monitoring (NAEMS) Project: Air Emissions from California Dairies
Project Description
Accurately assess emissions from livestock operations and compile a database for estimation of emission rates, promote a national consensus for emissions-estimation methods/procedures from livestock operations. Includes monitoring of VOCs and GHG emissions at a commercial dairy using open-path Fourier transform infrared (OP-FTIR) analyzer

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	Ag Air Research Council (AARC)	\$250,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location

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Related info 1

Status update as of May 2008

Related info 2

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Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California

Project ID	Project Type	Status	In progress	Estimated Completion Date	May 2009
2	Dairy Emissions				

Project Name
Air Emissions from California Dairies, Part I (NAEMS Add-on) [Includes monitoring of VOCs and GHG emissions using open-path Fourier transform infrared (OP-FTIR) analyzer]
Project Description
Accurately assess emissions from livestock operations and compile a database for estimation of emission rates, promote a national consensus for emissions-estimation methods/procedures from livestock operations. Includes monitoring of VOCs and GHG emissions at a commercial dairy using open-path Fourier transform infrared (OP-FTIR) analyzer

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	ARB	\$40,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
Y. Zhao	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location

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Related info 1
Status update as of May 2008
Related info 2

Please provide project updates and corrections to:
 Janet Spencer, Planning and Technical Support Division
 jspencer@arb.ca.gov
 916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Estimated Completion Date
3	Dairy Emissions	In progress	May 2009

Project Name
Air Emissions from California Dairies, Part II
Project Description
Accurately assess emissions from livestock operations and compile a database for estimation of emission rates, promote a national consensus for emissions-estimation methods/procedures from livestock operations. Includes monitoring of VOCs and GHG emissions at a commercial dairy using open-path Fourier transform infrared (OP-FTIR) analyzer

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	CDFA	\$70,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
Y. Zhao	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location

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Related info 1
Status update as of May 2008
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California

Project ID	Project Type	Status	In progress	Estimated Completion Date	May 2009
4	Dairy Emissions				

Project Name
Air Emissions from California Dairies, Part III
Project Description
Accurately assess emissions from livestock operations and compile a database for estimation of emission rates, promote a national consensus for emissions-estimation methods/procedures from livestock operations. Includes monitoring of VOCs and GHG emissions at a commercial dairy using open-path Fourier transform infrared (OP-FTIR) analyzer

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	UC Davis, College of Ag and Env'al Sciences	\$40,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
Y. Zhao	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location

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Related info 1
Status update as of May 2008
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California

Project ID	Project Type	Status	In progress	Estimated Completion Date	July 2008
5	Dairy Emissions				

Project Name
Process-Based Farm Emission Model to Estimate Air Emissions from California Dairies
Project Description
Using biological principles and engineering studies, develop a feed/waste stream process-based dairy farm emission model for VOC emissions.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
R. Zhang	UC Davis	ARB	\$300,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
F. Mitloehner	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
A. Goldstein	UC Berkeley		

Report Location

Related info 1
Project description at http://www.arb.ca.gov/ag/caf/RuihongZhangDairySymposiumOt06.pdf
Related info 2
Field phase in progress as of Feb. 2008

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California

Project ID	Project Type	Status	Estimated Completion Date
6	Dairy Emissions	In progress	January 2007

Project Name
Dairy Air Quality Monitoring of ROG and Ammonia in the Central Valley of California
Project Description
Maintain staffing and supplies for field and laboratory work to continue the ARB funded ROG project until 2006

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
C. Krauter	CSU Fresno	CSU Agricultural Research Initiative	\$208,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
D. Goorahoo	CSU Fresno	ARB	
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
B. Goodrich	CSU Fresno	SJVAPCD	

Report Location

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Related info 1
http://www.epa.gov/ttn/chief/conference/ei15/session6/beene.pdf
Related info 2
http://www.epa.gov/ttn/chief/conference/ei14/session1/goorahoo_pres.pdf

Please provide project updates and corrections to:
 Janet Spencer, Planning and Technical Support Division
 jspencer@arb.ca.gov
 916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Estimated Completion Date
7	Dairy Emissions	Partially complete	June 2006

Project Name
Evaluating Dairy Ammonia, Methane, and Hydrogen Sulfide Emissions Using Tunable Diode Lasers

Project Description
Develop real-time methods for evaluating process and time specific emission profiles for NH₃, CH₄, and H₂S at dairies. A program to monitor ammonia emissions using the USEPA Emission Isolation Flux Chamber began in 2006 and will continue through 2008.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
D. Goorahoo	CSU Fresno	CSU Agricultural Research Initiative	\$98,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
C. Krauter	CSU Fresno	ARB	
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
B. Goodrich	CSU Fresno	Boreal Lasers	

Report Location <http://www.epa.gov/ttn/chief/conference/ei15/session6/beene.pdf>

Related info 1
<http://www.4cleanair.org/Documents/APCODetermination.pdf>

Related info 2
Abstract on page 9 at this site:
<http://www.epa.gov/ttn/chief/conference/ei14/final2005.pdf>

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Estimated Completion Date
8	Dairy Emissions	In progress	June 2008

Project Name
Dairy Operations: An Evaluation and Comparison of Baseline and Potential Mitigation Practices for Emissions Reductions In the San Joaquin Valley
Project Description
Project is designed to obtain data needed to better estimate baseline dairy emissions and to estimate the emission reductions achievable with available control technologies.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
C. Krauter	CSU Fresno	ARB	\$250,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
D. Goorahoo	CSU Fresno	possible matching funds - CSUS Fresno Agricultural	\$250,000
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
B. Goodrich	CSU Fresno		

Report Location

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Related info 1
http://www.epa.gov/ttn/chief/conference/ei15/session6/beene.pdf
Related info 2
Continuation of previous work

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Estimated Completion Date
9	Dairy Emissions	In progress	December 2006

Project Name
Air Emission Mitigation Techniques and Technologies for California Dairies
Project Description
Evaluate dairy PM10, 2.5, VOC, and ammonia emission mitigation practices for potential effectiveness. Includes lagoon and corral areas.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	Merced County via SWRCB and UC matching	\$600,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
R. Zhang	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
P. Robinson	UC Davis		

Report Location

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Related info 1
Project objective described in PowerPoint at: ftp://ftp.arb.ca.gov/carbis/ag/agadvisory/mitloehner05jan26.pdf
Related info 2
SJVAPCD Aug. 2005 VOC Emission Factors for Dairies, http://www.4cleanair.org/Documents/APCODetermination.pdf

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	June 2005
10	Dairy Emissions				

Project Name
Volatile Organic Compound (VOC) Emissions from Cows Fed Typical California Rations
Project Description
Measurements of alcohols, volatile fatty acids, phenols, and methane (CH ₄) emitted from nonlactating (dry) and lactating dairy cows and their manure under controlled conditions. The experiment was conducted in an environmental chamber that simulates commercial concrete-floored freestall cow housing conditions. The fluxes of methanol, ethanol, and CH ₄ were measured from cows and/or their fresh manure.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	US EPA	\$75,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
B. Flocchini	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
P. Robinson	UC Davis		

Report Location	http://jeq.scijournals.org/cgi/content/full/37/2/615
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Related info 1
http://www.4cleanair.org/Documents/APCODetermination.pdf
Related info 2
UCD Dairy Air Quality Symposium presentation 10-11-06 available at: http://www.arb.ca.gov/ag/caf/FrankMitloehnerDairySymposiumOct06.pdf

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	June 2007
11	Emissions Mitigation				

Project Name
Effects of Liquid Dairy Manure Aeration on Air Quality and Nutrient Cycling
Project Description
This project will evaluate the air and water emission mitigation effects of a wastewater treatment technology for California dairies to determine whether/to what extent aerobic treatment systems can cost-effectively reduce environmental impacts associated with manure storage.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
C. Collar	UCCE - Kings County	UC ANR	\$30,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
F. Mitloehner	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
J. McGarvey	USDA - ARS	UCCE	

Report Location	Paper is presented in the book, "Dairy Manure Management: Treatment, Handling, and Community Relations". Available for \$42 at: http://www.nraes.org/nra_order.taf?_function=detail&pr_id=48&_UserReference=8429860989D7
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Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	2006
12	Dairy Waste				

Project Name
Characterization of Dairy Waste Management Strategies with Regard to Pathogens and Air Quality
Project Description
Examine the effect that aerobic and anaerobic treatments have on the microbiological and chemical properties of waste.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	USDA - ARS	\$30,300
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
R. Zhang	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location	Abstract available at: http://www.ars.usda.gov/research/publications/publications.htm?SEQ_NO_115=195211
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Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Estimated Completion Date
13	Dairy Emissions		May 2007

Project Name
Estimating and Reducing Air Emissions from Dairy Feeding Operations
Project Description

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	USDA - CSREES	\$278,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
R. Zhang	UC Davis	USDA - ARS?	
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
C. Krauter	CSU Fresno	CSU Fresno	

Report Location

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Related info 1

Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Estimated Completion Date
14	Dairy Nutrient		June 2008

Project Name
Nutrient Balances in California Dairy Herds
Project Description

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
A. Costillo	UCCE Merced	UC ANR	\$40,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
F. Mitloehner	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
D. Bacon	UCCE Tulare		

Report Location	http://calag.ucop.edu/0702AMJ/pdfs/DairyMinerals.pdf
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Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California

Project ID	Project Type	Status	Estimated Completion Date
15	Dairy Emissions		March 2008

Project Name
Effects of Dietary Rumensin® on GHG and VOC Emissions from Lactating Dairy Cows
Project Description

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	Eli Lilly-Elanco	\$50,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
E. DePeters	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
J. MacGarvey	USDA - ARS		

Report Location

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Related info 1

Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Estimated Completion Date
16	Education Study		May 2010

Project Name
Western Region Dairy Odor and Air Quality Education
Project Description

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
P. Ndegga	WSU	USDA - SARE	\$89,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
F. Mittloehner	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
R. Sheffield	Univ. of Idaho		

Report Location

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Related info 1
Other researchers from NM State (R. Hagevoort) and OSU (M. Gamroth)
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status		Estimated Completion Date	??
17	Dairy Emissions				

Project Name
Evaluation of Key Dairy Emission Sources - Quantification of VOCs and Ammonia for Feed, Corrals, and Land Application of Wastes
Project Description

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
CE Schmidt	Contractor	??	
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location

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Related info 1
http://www.4cleanair.org/Documents/APCODetermination.pdf

Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status		Estimated Completion Date	
18	Livestock Study				

Project Name
Volatile Organic Compounds (VOCs) and Their GHG Emissions from Growing and Finishing Feedlot Steers and their Waste
Project Description

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis		
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location	
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Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Estimated Completion Date
19	Equipment Study		December 2006

Project Name
UC Equipment Matching Funds Program
Project Description

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	UC Davis, Chancellor for Research	\$140,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location

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Related info 1

Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status		Estimated Completion Date	TBD
20	Manure Digester				

Project Name
Covered Lagoon Digester Emission Measurements
Project Description
Measurements of NH ₃ , methane, and VOCs at dairies with CEC funded dairy digester installations.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
TBD	TBD	CEC	\$500,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location

Related info 1
13 studies using Title search term "Digester": http://www.energy.ca.gov/publications/searchReports.php
Related info 2
Possible RFR release in early 2006

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Estimated Completion Date	Unknown
21	Manure Study			

Project Name
Establishment of testing protocols for manure treatment (not sure if project was ever funded)
Project Description
Compile a database of manure additives and commercial products claimed to mitigate NH3 or VOC emission. Investigate the mechanism for creating the reduction by each product. Evaluate multimedia effects of products on dairies. Develop a protocol to test the claims of reductions.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
D. Meyer	UC Davis	SCAQMD	
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
W. Powers			
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
E. Tooman			

Report Location

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Related info 1

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Related info 2

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Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California

Project ID	Project Type	Status	In progress	Estimated Completion Date	July 2006
22	PM Emissions				

Project Name
Agricultural sources of PM10 and ozone precursors
Project Description
Compile PM10 and NH3 emission factors. Measure concentrations of VOC relevant to ozone formation upwind and downwind of dairies

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
R. Flocchini	UC Davis	USDA	\$374,145
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
C. Parnell	Texas A&M		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
R. Higashi	UC Davis		

Report Location

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Related info 1

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Related info 2

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Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Estimated Completion Date
23	Emissions Modeling	In progress	June 2007

Project Name
Developing a Process Based Model for GHG for California Dairies
Project Description
Using biological principles and mass balance, develop a cradle-to-grave emissions model to provide greenhouse gas emissions estimates for dairies.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	CEC PIER	\$119,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
W. Salas	Univ. New Hampshire		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
R. Zhang	UC Davis		

Report Location	page 259 at: http://www.ncsu.edu/airworkshop/Ag_Air_Quality_Modeling.pdf
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Related info 1
Funded with \$500,000 total - \$119,00 for Mitloehner portion
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California

Project ID	Project Type	Status	Completed	Estimated Completion Date	2005
24	Livestock Study				

Project Name
Development of a Process-Based Ammonia Model for Livestock Sources
Project Description
Develop a process-based model of ammonia emissions from five types of animal feeding operations: dairy, beef, swine, chicken, and turkey.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
G. Tonneson	UC Riverside	LADCO	\$250,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
Z. Wang	UC Davis	Lake Michigan Air Directors Consortium	
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
G. Mansell	ENVIRON Int'l Corp.		

Report Location	EPA conference at: http://www.epa.gov/ttn/chief/conference/ei14/index.html (search Zhang)
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Related info 1
Other researchers - J. Fadel, R. Zhang, G. Mansell, J. Haasbeek.
Related info 2
Abstract on page 9 at: http://www.epa.gov/ttn/chief/conference/ei14/final2005.pdf

Please provide project updates and corrections to:
 Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
 916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	March 2005
25	Education Study				

Project Name
Development of an Air Module Curriculum for the California Dairy Quality Assurance Program (CDQAP)
Project Description

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	US EPA	\$50,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
D. Meyer	UC Davis, CDQAP		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
M. Payne			

Report Location	http://www.cdqa.org/reports/CDQAP%20Annual%20Report%202005.pdf
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Related info 1
http://www.4cleanair.org/Documents/APCODetermination.pdf
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
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916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	December 2005
26	Ammonia Emissions				

Project Name
Laser-based Sensors for Monitoring Ammonia Emissions
Project Description
A trace-gas sensor based on fibre-amplifier enhanced photoacoustic spectroscopy has been developed for measuring ambient ammonia in agricultural settings. Field testing was performed in environmental chambers at UC Davis where the excreta from three Holstein cows were allowed to accumulate, providing a source of ambient ammonia.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
C. Patel	Pranalytica	USDA - SBIR I	\$20,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
F. Mitloehner	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location	http://www.pranalytica.com/pdf/MST-16-1547-2005.pdf
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Related info 1
\$79,000 total; \$20,000 for Mitloehner portion
Related info 2
Institute of Physics Publishing, Meas. Sci. Technol. 16 (2005) 1547-1553

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Estimated Completion Date
27	Ammonia Emissions		December 2006

Project Name
Laser-based Sensors for Monitoring Ammonia Emissions
Project Description
A trace-gas sensor based on fibre-amplifier enhanced photoacoustic spectroscopy has been developed for measuring ambient ammonia in agricultural settings. Field testing was performed in environmental chambers at UC Davis where the excreta from three Holstein cows were allowed to accumulate, providing a source of ambient ammonia.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
C. Patel	Pranalytica	USDA - SBIR II	\$75,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
F. Mitloehner	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location

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Related info 1
\$350,000 (\$75,000 for Mitloehner portion)
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	July 2005
28	Livestock Study				

Project Name
Effect of Atmospheric Ammonia on Pig Welfare
Project Description

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	National Pork Board	\$40,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location	08/24/07 Pork Board abstract: http://www.pork.org/PorkScience/Research/Documents/03-159-MITLOEHNER.ABS.8-27-04.pdf
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Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	In progress	Estimated Completion Date	September 2011
29	Worker Exposure				

Project Name
Respiratory Exposures and Health of Workers on California Dairies (NIOSH)
Project Description
Monitor exposures of 200 dairy workers at large dairies to dust and ammonia to define the concentrations of any airborne pollutants highly associated with respiratory problems.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	NIOSH	\$1,700,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
M. Schenker	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
D. Bennett			

Report Location

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Related info 1
UC Davis' program - CA Dairy Environ Health Research Initiative (Cal-DEHRI)
Related info 2
Field phase in progress, June 2008

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	February 2006
30	Pesticide Study				

Project Name
Investigation of Atmospheric Ozone Impacts of Selected Pesticides
Project Description
Develop methods for estimating and quantifying ozone impacts for selected pesticide compounds for which such estimates are not currently available.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
W. Carter	UC Riverside	ARB	\$100,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location	Report of Jan. 10, 2007 available at: http://www.arb.ca.gov/research/apr/past/04-334.pdf
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Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	In progress	Estimated Completion Date	June 2007
31	Pesticide Study				

Project Name
Agricultural Pesticide VOC Sources and their Photochemical Ozone Formation Potential
Project Description
Improve current understanding of the photochemical O3 formation potential of VOCs from agricultural pesticide applications in the San Joaquin Valley.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
B. Flocchini	UC Davis	USDA	\$400,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
R. Higashi	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
M. Kleeman	UC Davis		

Report Location

Related info 1http://airquality.ucdavis.edu/pages/events/2008/green_acres/GREEN.pdf**Related info 2**

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California

Project ID	Project Type	Status	Completed	Estimated Completion Date	2005
32	Emissions Mitigation				

Project Name
Commercialization of Intermittent Water Sealing
Project Description
Identify optimal water management strategies for water sealing commercial-scale application of fumigants.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
D. Sullivan	Sullivan Environmental	USDA	\$78,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
H. Ajwa			
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
J. Radewald			

Report Location	http://mbao.org/2005/MBAO%202005%20pdfs/Preplant/8/Sullivan.pdf
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Related info 1
CDPR participated in the study
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Estimated Completion Date
33	Ammonia Emissions		December 2005

Project Name
Improved Statewide Estimates of Ammonia Emissions from Native Soils in California
Project Description
Develop California specific ammonia emission factors and modeling for native soils within California

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
C. Krauter	CSU Fresno	ARB	\$200,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
C. Potter	NASA Ames		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
S. Klooster	CSU Monterey		

Report Location

Related info 1
2003 Presentation at EPA conference.
<http://www.epa.gov/ttn/chief/conference/ei12/index.html> (search Krauter)

Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	June 2005
34	Crop Study				

Project Name
Monitoring of Ammonia Emissions from Crop Production With a Tunable Diode Laser

Project Description
Evaluate the use of a TDL system for the determination of ambient ammonia levels and ammonia emissions from specific agricultural operations.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
C. Krauter	CSU Fresno	CSU Agricultural Research Initiative	\$296,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
D. Goorahoo	CSU Fresno		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
B. Goodrich	CSU Fresno		

Report Location

Partial, 2005 EPA conference.
<http://www.epa.gov/ttn/chief/conference/ei14/index.html> (search Krauter)

Related info 1
\$296,000 ARI to match ARB and UniSearch funding

Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California

Project ID	Project Type	Status	Estimated Completion Date
35	PM Emissions	Proposed	2011 (CA in 2009)

Project Name
Cotton Gin PM Emissions Research
Project Description
Evaluate the accuracy of US EPA's sampling methods which may significantly over-estimate PM emissions (CTM-039, P 2.5 Stack Sampling Method). Develop PM dispersion models for PM10, PM2.5, total suspended particulates (TSP). Characterize particle size, shape. Six test sites, 1 in CA.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
M. Buser	USDA ARS Lubbock TX	Various cotton industry and ginners associations	\$147,500
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
D. Whitelock	ARS - SWCotton Ginning Research	ARB	\$45,000
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
C. Boykin	Cotton Ginning Research Unit,	SJVAPCD	\$36,000

Report Location

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Related info 1

Related info 2

Please provide project updates and corrections to:
 Janet Spencer, Planning and Technical Support Division
 jspencer@arb.ca.gov
 916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Proposed	Estimated Completion Date	??
36	PM Emissions				

Project Name
Evaluation of PM Emissions from Raisin Harvesting (PROPOSED)
Project Description
Evaluate emissions from three different table grape harvesting techniques

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
C. Krauter	CSU Fresno	??	
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location

Related info 1

Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status		Estimated Completion Date	
37	Emissions Mitigation				

Project Name
Testing to Determine Emissions Reductions Achieved by Lower Emitting Agricultural Practices
Project Description
Evaluation of control effectiveness of two SJVAPCD Conservation Management Practices for PM (conservation tillage and combined operations)

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
		US EPA RARE ??	
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location	
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Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Proposed	Estimated Completion Date	
38	N2O Emissions				

Project Name
Fertilizer N2O Research (PROPOSED)
Project Description
ARB, CEC, CDFA are responding to RFPs released earlier in 2008.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
?	?	ARB	
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
		CEC	
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
		CDFA	

Report Location

Related info 1
Project selection dates: CEC 8/08, CDFA 10/08, ARB 11/08
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	October 2007
39	VOC Emissions				

Project Name
DPR Round-Robin VOC Study
Project Description
Determine ways to improve VOC emission estimates for solvents in pesticide formulations by comparing the emissions under field conditions to emissions seen in traditional TGA testing. Results showed more ozone production on the downwind side, but only slightly. Most of the VOC increase after spraying is NOT from the solvent being regulated but from EtOH in fuel. To decrease ozone, NOx reduction more important than VOC reduction.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
P. Green	UC Davis	None; cooperative effort of industry including European	\$0
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location	presentation at CDPR, date unknown: http://www.cdpr.ca.gov/docs/emon/vocs/vocproj/voc_regional_ozone.pdf
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Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status		Estimated Completion Date	??
40	VOC Emissions				

Project Name
Reducing Emissions of VOCs from Agricultural Soil Fumigation: Comparing Emission Estimates from Simplified Methodology
Project Description
Develop estimates for cumulative and hourly emissions rates from laboratory, field plot and predictive models which will be compared to previous large-scale field experiments on several emission reduction strategies

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Dr. Yates	??	??	
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location

Related info 1

Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	August 2001
41	Manure Digester				

Project Name
Interim Report: Sources and Sinks of PM10 in the San Joaquin Valley, August 2001
Project Description
Evaluate on-field PM10 emissions. Evaluate PM10 and ammonia emissions for feedlots and dairies.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
R. Flocchini	UC Davis	USDA	
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
T. Cassel	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location	http://www.arb.ca.gov/app/library/libcc.php (Search on author = Flocchini)
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Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California

Project ID	Project Type	Status	Completed	Estimated Completion Date	June 2001
42	Ammonia Emissions				

Project Name
Statewide Inventory Estimates of Ammonia Emissions from Native Soils and Chemical Fertilizers in California
Project Description
Measure and model ammonia emissions from agricultural fertilizer application and natural soils. Report available at: ftp://ftp.arb.ca.gov/carbis/reports/l522.pdf

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
C. Krauter	CSU Fresno	ARB	\$186,425
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
C. Potter	NASA Ames		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
S. Klooster	CSU Monterey		

Report Location	http://www.arb.ca.gov/app/library/libcc.php (search on author = Potter)
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Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California

Project ID	Project Type	Status	Completed	Estimated Completion Date	June 1996
43	PM Emissions				

Project Name
Results of the Measurement of PM10 Precursor Compounds from Dairy Industry Livestock Waste
Project Description
Using environmental flux chambers, evaluate dairy ammonia and ROG emissions.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
C. Schmidt	Consultant	South Coast AQMD	
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location	http://www.epa.gov/ttn/chief/conference/ei14/session1/schmidt.pdf
-----------------	---------------------------------------------------------------------------------------------------------------------------------------------------

Related info 1
http://www.aqmd.gov/rules/proposed/pr1127.html
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	January 1995
44	VOC Emissions				

Project Name
Results of the Measurement of Volatile Organic Compounds from Livestock Wastes
Project Description
Evaluate process specific VOCs from dairies in the Sacramento region.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
C. Schmidt	Consultant	US EPA	
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location

Related info 1
<http://www.4cleanair.org/Documents/APCODetermination.pdf>

Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	January 2002
45	Dairy Waste Management				

Project Name
Survey Current Livestock Waste Management Practices in the South Coast Air Basin

Project Description
Evaluate manure management practices in the SCAQMD http://www.aqmd.gov/rules/proposed/pr1127.html

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Egigian-Nichols	Tetra Tech Inc	South Coast AQMD	
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location	http://www.aqmd.gov/rules/support.html
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Related info 1

Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	March 2003
46	Livestock Waste Management				

Project Name
Literature Survey and National Programs, Livestock Waste Management Practices Survey and Control Option Assessment
Project Description
Literature survey of waste management and control options. http://www.aqmd.gov/rules/proposed/pr1127.html

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Egigian-Nichols	Tetra Tech Inc	South Coast AQMD	
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location	http://www.aqmd.gov/rules/support.html
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Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	March 2003
47	Livestock Waste Management				

Project Name
Identify Potential Waste Management Practices Reducing Ammonia and VOCs, Livestock Waste Management Practices Survey and Control Option Assessment
Project Description
Identify livestock practices to reduce emissions. http://www.aqmd.gov/rules/proposed/pr1127.html

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Egigian-Nichols	Tetra Tech Inc	South Coast AQMD	
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location	http://www.aqmd.gov/rules/support.html
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Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	December 2003
48	Livestock Waste Management				

Project Name
Emissions of Particulate Matter and Ammonia from Cattle Feedyards and Dairies: a Texas-California Partnership
Project Description
Quantify the effects of water application and manure harvest frequency on PM and NH3 emission from dry lots housing beef or dairy animals (heifers).

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
B. Auvermann	Texas CEC	National Center for Manure and Animal Waste	\$12,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
W. Harman	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
D. Meyer	UC Davis		

Report Location	http://amarillo.tamu.edu/~bauvermann/ConferenceProceedings/effectofsprinkling.pdf
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Related info 1
http://amarillo.tamu.edu/~bauvermann/ConferenceProceedings/index.htm

Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	Complete
49	Dairy Emissions				

Project Name
Evaluating Dairy Process Emissions Using Flux Chambers
Project Description
Using environmental flux chambers at a working dairy, evaluate relative emission levels of individual process including lagoons, flush lanes, and corrals.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
CE Schmidt	Contractor	ARB	\$50,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
		SJVAPCD	
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location	Technical Memorandum at: http://www.arb.ca.gov/ag/caf/SchmidtDairyTestData2005.pdf
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Related info 1
http://www.4cleanair.org/Documents/APCODetermination.pdf
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	December 2005
50	Dairy Emissions				

Project Name
Measuring Dairy Cow Emissions in an Environmental Chamber
Project Description
Place cows into an environmentally controlled chamber and evaluate speciated VOC emissions emitted directly from cows and from fresh waste products.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	US EPA	\$75,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
R. Flocchini			
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
J. Peters			

Report Location	Final Report May 31, 2006. http://www.arb.ca.gov/ag/caf/MitloehnerDairyChamberEmissions2006.pdf
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Related info 1
http://www.4cleanair.org/Documents/APCODetermination.pdf
Related info 2
J Environ Qual 37:615-622 (2008)

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	
51	Dairy Emissions				

Project Name
Volatile Fatty Acids, Amine, and Phenol Emissions from Cows and their Waste
Project Description

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	ARB	\$200,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
S. Trabue	USDA ARS		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
J. Koziel	ISU		

Report Location	http://www.arb.ca.gov/ag/caf/MitloehnerDairyChamberEmissions2006.pdf
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Related info 1
http://www.4cleanair.org/Documents/APCODetermination.pdf
Related info 2
http://jeq.sciijournals.org/cgi/content/full/37/2/615

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	June 2004
52	PM Emissions				

Project Name
Improvement of PM10 emission factors for almond harvesting
Project Description
Refine existing PM10 emission factors for almond harvesting. Estimates based on measured PM10 during almond sweeping and pick up.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
R. Flocchini	UC Davis	Almond Board of California	
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
C. Parnell	Texas A&M		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location	abstract available at: http://asae.frymulti.com/abstract.asp?aid=20039&t=2
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Related info 1
Results showed that in all instances, the concentrations obtained from using the PM10 sampler were always higher than those obtained from using the TSP sampler.

Related info 2
Contact Terry Cassel, UCD to see if report available: tacassel@ucdavis.edu

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	July 2007
53	VOC Emissions				

Project Name
Photochemical Ozone Formation Potential of Agricultural VOC Sources
Project Description
Ozone formation potential of emissions from dairy cattle was much lower than predicted using regulatory profiles. The majority of the ozone formation is explained by ethanol (EtOH) emissions, not by acetone as previously thought. Ozone formation potential is generally small (<20 ppb) when EtOH conc. were 200 ppb and NOx conc. were 50 ppb. Results suggest that decreasing ROG (VOC) from dairy cattle, specifically by decreasing EtOH conc., will not likely lead to decreased ozone in the

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
P. Green		USDA	\$300,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
F. Mitloehner			
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
R. Flocchini			

Report Location	http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6VH3-4S0YXTM-2&_user=1928924&_rdoc=1&_fmt=&_orig=search&_sort=d&view=c&_version=1&_urlVersion=0&_userid=1928924&md5=e020b1203499a23d5
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Related info 1
presentation at CDPR, date unknown: http://www.cdpr.ca.gov/docs/emon/vocs/vocproj/voc_regional_ozone.pdf
Related info 2
Alternate site for report: Go to http://dx.doi.org and enter "doi:10.1016/j.atmosenv.2008.02.064"

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

**California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	May 2005
54	Livestock Emissions				

Project Name
Measuring Broiler Emissions in Tunnel Ventilated Housing
Project Description
Measure PM10, ammonia, and speciated TOG emissions emitted from a tunnel ventilated broiler house during various stages of bird growth.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
M. Summers	CDFA	California Poultry Federation	\$40,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
D. Duke	Foster Farms		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location	http://www.arb.ca.gov/ag/caf/poulemisrpt.pdf
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Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 6/29/2009

California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California

Project ID	Project Type	Status	Completed	Estimated Completion Date	December 2005
55	VOC Emissions				

Project Name
Evaluating Dairy Reactive Organic Gas Emissions
Project Description
Chemically speciate ROG samples collected at dairies. Attempt to develop emission factors for dairies and some individually tested dairy processes. Further study continues in 2005-2008.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
C. Krauter	CSU Fresno	ARB	\$100,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
D. Goorahoo	CSU Fresno	CSU Foundation	\$20,000
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
B. Goodrich	CSU Fresno		

Report Location	Results at 2005 US EPA Emissions Inventory Conference - http://www.airquality.nrcs.usda.gov/AAQTF/Documents/Amarillo_2005/Presentation-CA%20Dairy%20ROGs%20(Krauter%20AAQTF
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Related info 1
http://www.4cleanair.org/Documents/APCODetermination.pdf
Related info 2
http://www.epa.gov/ttn/chief/conference/ei15/session6/beene.pdf

Please provide project updates and corrections to:
 Janet Spencer, Planning and Technical Support Division
 jspencer@arb.ca.gov
 916.324.2717

Date: 6/29/2009

California Air Resource Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California

Project ID	Project Type	Status	In progress	Estimated Completion Date	September 2008
56	Manure Study				

Project Name
Dairy Wastewater Treatment Feasibility Study
Project Description
Assess the feasibility of applying standard wastewater treatment technology to the management of manure from cows in typical California dairies. EPA plans to incorporate this information into its on-going assessment of technologies for dairy manure management.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Trygve Lundquist	Cal-Poly SLO	US EPA	\$19,936
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
			\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

Report Location	(When available) http://www.epa.gov/region09/ag/dairy/technologies.html
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Related info 1
http://www.arb.ca.gov/ag/caf/dairypnl/dairypanel.htm
Related info 2

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